MAR/FY06

RIVERBANK ARMY AMMUNITION PLANT

California

Base Realignment & Closure
Installation Action Plan

Final 30 August 2006

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Statement of Purpose

The purpose of the Base Realignment and Closure (BRAC) Installation Action Plan (BIAP) is to outline the total multi-year Cleanup Program for an installation. The plan identifies environmental cleanup requirements at each site or area of concern, and proposes a comprehensive, installation-wide approach, with associated costs and schedules, to conduct investigations and necessary remedial actions (RAs).

In an effort to coordinate planning information between the restoration manager, US Army Environmental Center (USAEC), Riverbank Army Ammunition Plant, BRAC Division, executing agencies, and regulatory agencies, a BIAP was completed. The BIAP is used to track requirements, schedules and tentative budgets for all major Army installation cleanup programs.

All site-specific funding and schedule information has been prepared according to projected overall Army funding levels and is, therefore, subject to change.

The following persons contributed to the formulation and completion of this Installation Action Plan during a planning workshop held on 2 March 2006:

Company/Installation/Branch

AHTNA Government Services (PBC Contractor)

Army BRAC Division

Engineering and Environment, Inc. for USAEC

RBAAP Commanders Representative

RBAAP Facilities Specialist

RWQCB (Regional Water Quality Control Board)

SOTA Environmental

USAEC

USACE Sacramento Project Manager

US Army Corps of Engineers Sacramento

US Environmental Protection Agency (USEPA)

Acronyms & Abbreviations

ACSIM	Assistant Chief of Staff for Installation Management
AEDB-R	Army Environmental Database – Restoration
ALCOA	Aluminum Company of America
AMC	Army Materiel Command
BRAC	Base Realignment and Closure
BRACD	Base Realignment and Closure Division
CTC	Cost-to-Complete
CTT	Closed, Transferred, Transferring
cy	cubic yards
DERA	Defense Environmental Restoration Account
DESERTS	Defense Site Environmental Restoration
DLM	Designated Level Methodology
DoD	Department of Defense
DRMO	Defense Reutilization and Marketing Office
DRO	Diesel Range Organics
DTSC	Department of Toxic Substances Control
EE/CA	Engineer Evaluation/Cost Analysis
E/P	Evaporation/Percolation
EPA	(United States) Environmental Protection Agency
ER,A	Environmental Restoration, Army (formerly called DERA)
FFSRA	Federal Facility Site Remediation Agreement
FS	Feasibility Study
FFPR	Firm Fixed Price Remediation
ft	foot
FUDS	Formerly Used Defense Sites
FY	Fiscal Year
GOCO	Government Owned/Contractor Operated
GRO	Gasoline Range Organics
GW	Groundwater
GWTP	Groundwater Treatment Plant
GWTS	Groundwater Treatment System
HRS	Hazard Ranking Score
IA	Installation Assessment
IAG	Interagency Agreement
IAP	Installation Action Plan
IGWTS	Interim Groundwater Treatment System
IOC	Industrial Operations Command
IRA	Interim Remedial Action
IRM	Interim Remedial Measures
IRP	Installation Restoration Program
IWTP	Industrial Waste Treatment Plant
K	$1,000
kg	kilograms
L	Liter

Acronyms & Abbreviations

lb	pound
LRE	Limited Risk Evaluation
LTM	Long-term Management
MACOM	Major Command
MC	Munitions Constituents
MCL	Maximum Contaminant Level
MEC	Munitions and Explosives of Concern
mg	milligrams
MMRP	Military Munitions Response Program
MSC	Major Subcommand
MW	monitoring well
ND	Non-Detect
NE	Not Evaluated
NI	Norris Industries
NFA	No Further Action
NPL	National Priorities List
OSC	Operations Support Command
OU	Operable Unit
PA	Preliminary Assessment
PBC	Performance-Based Contract
PAH	Polynuclear aromatic hydrocarbons
PCB	polychlorinated biphenyl
PiC	picoCuries
PID	Photo ionization detector
POL	Petroleum, Oil & Lubricants
PRG	Preliminary Remediation Goals
PWS	Performance Work Statement
RA	Remedial Action
RA(C)	Remedial Action - Construction
RA(O)	Remedial Action - Operation
RAB	Restoration Advisory Board
RBAAP	Riverbank Army Ammunition Plant
RC	Response Complete
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
REM	Removal
RI	Remedial Investigation
RIP	Remedy in Place
ROD	Record of Decision
RPM	Remedial Project Manager
RRO	Residual Range Organics
RRSE	Relative Risk Site Evaluation
RWQCB	Regional Water Quality Control Board
SI	Site Inspection
SVE	Soil Vapor Extraction

Acronyms & Abbreviations

SVOC	Semi-Volatile Organic Compounds
SWMU	Solid Waste Management Unit
TBD	To Be Determined
TCE	trichloroethylene
TCDD	tetrachloro-dibenzo dioxin
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalents
TOC	Total Organic Hydrocarbons
TP	Test Pit
TPH	Total Petroleum Hydrocarbon
TRC	Technical Review Committee
µg/l	microgram per liter
USACE	United States Army Corps of Engineers
USACHPPM	United States Army Center for Health Promotion and Preventive Medicine
USAEC	United States Army Environmental Center
USAF	United States Air Force
USAMC	United State Army Material Command
UST	Underground Storage Tank
UXO	Unexploded Ordnance
VOC	Volatile Organic Compounds
WTP	Water Treatment Plant
Yr	Year

Installation Information

Installation Locale: The RBAAP facility is located at 5300 Claus Road, Riverbank, Stanislaus County, California, one mile south of the Stanislaus-San Joaquin County border and approximately ten miles northeast of the City of Modesto. The plant lies in a moderate climatologic region of the San Joaquin Valley in central California to the west of the Sierra Nevada Mountains. RBAAP occupies a total of 173 acres of land and consists of two non-contiguous areas represented by the main plant area (approx 146 acres) and the Evaporation/Percolation (E/P) Ponds (27 acres) which are located approximately 1.5 miles north of the RBAAP Plant boundary along the Stanislaus River. The four E/P ponds receive treated water from the Industrial Wastewater Treatment Plant (IWTP) and the Groundwater Treatment Plant (GWTP) and the effluent discharged to the bermed ponds evaporates or percolates through the existing sediments to groundwater. In general, the plant production area is mostly paved and consists of seven production lines, process water/groundwater treatment facilities and various buildings used for maintenance, administration and storage. RBAAP is bordered on the north, west and south by sparse residential areas, with the densest housing community lying west of the plant. RBAAP is bordered on the east by pastureland. Riverbank has a population of 16,400 and the nearest large community is Modesto located 10 miles southwest of the installation and having a population of 210,000.

Installation Size
Installation Acreage: 173 acres
BRAC Acreage: 173 acres
Acreage being transferred to other service: NA
Acreage being transferred to other federal agencies: NA
Acreage being transferred to non-federal agencies: TBD

List of Off Post Properties: EP Ponds are part of RBAAP but are located 1.5 miles north of the plant boundary

Environmental Condition of Property: TBD

Lead Organization: US Army Materiel Command (AMC)

Lead Executing Agencies:
Investigation Phase: US Army Corps of Engineers, Sacramento District
Remedial Action Phase: US Army Corps of Engineers, Sacramento District

Regulator Participation:
Federal: USEPA Region 9
State: Department of Toxic Substances Control (DTSC) and RWQCB

BRAC Closure Round: Round 5, BRAC 05

Status of Redevelopment Initiative (Reuse Plan): TBD

Organization Name: TBD
Plan Status: TBD
Development Plan Date: TBD

Existing Legal Agreements/Interim Leases: TBD

Significant Base Tenants: Louis M. Clark, Medical Relief Foundation, Wholesale Services Inc, Leisure RV Storage, Cingular Wireless, Riverbank Oil Transport, Sierra Railroad, California Highway Tech, Environmental Lube Solutions, ITEC Environmental Group.

Projected Date of Final Transfer of Property: TBD

National Priorities List (NPL) Status: Score 63.94/1994

Date for Construction Completion: 1995

Removal from the NPL: TBD

Installation Restoration Advisory Board (RAB)/Technical Review Committee (TRC)/Technical Assistance for Public Participation (TAPP) Status: A strong relationship between RBAAP and the community began in 1985 with the formulation of the TRC, the precursor to today's RABs. In 1943, DoD established RABs to increase public participation. RBAAP solicited community interest in forming a RAB, but since the cleanup process was already well underway, the ROD was already signed, and the community had been well informed throughout the process, little interest was expressed in establishing a RAB. Since the community was not in favor of establishing a formal RAB, RBAAP requested exemption to the DoD RAB policy to keep the TRC intact. Based on the current status of RBAAP as a BRAC05 Installation, the Army will solicit interest from the public concerning the formation of a RAB and establish a RAB if interest exists.

Installation Program Summaries
IRP
Primary Contaminants of Concern: Hexa-valent Chromium, Cyanide
Affected Media of Concern: Soil, Groundwater
Estimated Date for Response Complete (RC): 200809
Funding to Date (up to FY05): $54,627K
Current Year Funding (FY06): $741K
Cost-to-Complete (FY07+): $2,781K

MMRP

Primary Contaminants of Concern: MC (Munitions Constituents)
Affected Media of Concern: Soil
Estimated Date for RIP/RC: 200709
Funding to Date (up to FY05): $34K
Current Year Funding (FY06): $4K
Cost-to-Complete (FY07+): $0K

Transfer Summary

Total Installation Acres: 173 acres

BRAC Acres: 173 acres
Parcel Name: TBD
Recipient organization: TBD
Acres: TBD
Transfer strategy: TBD
Current land use: TBD
Future land use: TBD
Transfer date: TBD

Cleanup Program Summary

Installation Historic Activity:

Riverbank Army Ammunition Plant is an active government-owned/contractor-operated (GO/CO) industrial installation under the jurisdiction of the US Army Joint Munitions Command. RBAAP was constructed in 1942 by the Aluminum Company of America (ALCOA) as an aluminum reduction plant supplying military requirements. The plant was built under the authority of the Defense Plant Corporation. RBAAP started production on May 18, 1943. The plant was designed to produce 40,000 tons of aluminum per year. The plant was closed by order of the War Production Board on August 7, 1944 due to the reduced need for aluminum by the military in World War II.

After closure of the plant in 1944, the facilities were used for the storage of a variety of government surplus materials, including corn and grain. In 1951, the Army gained control of the plant to manufacture steel cartridge cases for joint use by the Army and Navy. The Norris Thermador Corporation (now NI Industries (NI)) was awarded the contract for conversion and operation of the plant. Since 1951, the plant has remained a government-owned/contractor-operated, industrial metal working plant. Manufactured materials, such as cartridge cases, grenades and projectiles are shipped to other ammunition plants for loading operations. Levels of production have fluctuated significantly, with peak periods corresponding to the Korean and Vietnam Conflicts.

RBAAP was proposed for inclusion on the National Priorities List (NPL) with a Hazard Ranking System (HRS) score of 63.94 and was officially named to the NPL on February 16, 1990. Subsequently, an Interagency Agreement was signed by the Army, EPA Region IX, California Department of Health Services (now California EPA - Department of Toxic Substances Control) and California Regional Water Quality Control Board, which became effective in June 1990.

RBAAP has been slated for closure under the BRAC 2005 law which was enacted by Congress in November 2005.

IRP: There are currently 2 active sites at RBAAP; RBAAP-01 (LTM Phase) and RBAAP-03 (RAO Phase)

- Prior Year Progress: Site-wide ROD signed in 1994, 1st 5 year review complete.
- Future Plan of Action: Continue to optimize the current groundwater treatment system in FY06.
- Finalize the second 5-year review in FY06.
- Initiate in situ treatment of groundwater in FY06.
- Evaluate groundwater data in order to optimize long-term management requirements in FY06.

MMRP: There is one MMRP site at RBAAP (RBAAP-001-R-01)

- Prior Year Progress: Completion of PA (CTT Report) and Historical Records Review (HRR)
- Future Plan of Action: Document findings of HRR and provide to USEPA.

RIVERBANK ARMY AMMUNITION PLANT

Installation Restoration Program

Total AEDB-R IRP sites/AEDB-R sites with Response Complete: 12/9

Different Site Types:

2 Contaminated Buildings	1 Contaminated Groundwater
1 Landfill	2 Spill Site Areas
4 Surface Impoundment/Lagoons	2 Waste Treatment Plants

Most Widespread Contaminants of Concern: Metals (chromium, cyanide)

Media of Concern: Groundwater, Soil

Completed Removal (REM)/Interim Remedial Action (IRA)/Remedial Action (RA):

1990

IRA, RBAAP-01, groundwater treatment, Sep
IRA, RBAAP-03, groundwater treatment, Dec

1993

RA(C), RBAAP-11, waste removal, soils, Dec

1995

RA(C), RBAAP-01, capping, Sep

1998

RA(C), RBAAP-03, groundwater treatment, Sep

Total IRP Funding:

Prior Years (up to FY05)	$54,627K
Current Year Funding (FY06)	$ 741K
Future Requirements (FY07+):	$ 2,781K
TOTAL:	$58,149K

Duration of IRP:

Year of IRP Inception: 1980
Year of IRP RIP/RC: 1998/2008
Year of IRP Completion including Long-Term Management (LTM): 2023

IRP Contamination Assessment Overview

There are currently 2 active sites at RBAAP; RBAAP-01 Landfill (LTM Phase) and RBAAP-03 Ground Water Contamination (RAO Phase) which are described in more detail in this IAP under IRP Site Descriptions.

The installation Restoration Program activities at RBAAP began in 1979 with an Installation Assessment. The Assessment concluded that areas of the RBAAP and the waste disposal ponds located off-site were potentially contaminated with heavy metals and other chemicals as a result of procedures used in past manufacturing operations and waste disposal practices. The assessment also indicated the potential for migration of the contaminants into the subsurface soils and waters.

The USEPA initially proposed RBAAP for inclusion on the National Priorities List (NPL) on June 24, 1988 and added it to the final list on February 21, 1990. A Federal Facilities Agreement was signed on April 5, 1990. Under this agreement, the Army agreed to complete the RI/FS and, eventually, perform the Remedial Design (RD) and implement the Remedial Action (RA) to address the environmental contamination at RBAAP.

Domestic Well Monitoring/Replacement Program: In addition to the on-site RBAAP RI activities, an off-site residential well sampling program was established in September 1985. The residential well sampling program consists of the quarterly sampling of approximately 70 wells located west of the RBAAP boundary. Water samples from six wells located west of the RBAAP showed levels of chromium in excess of 50 mg/L (drinking water standard). The initial response included the provision of bottled drinking water to those affected residents followed by the installation of deep replacement wells. This action was followed in 1992 with the extension of the Riverbank City water system which connected services to all potentially affected residents.

Groundwater Interim Remedial Action: Also, in 1989, an interim remedial action was initiated to address the groundwater contamination problem at RBAAP. A design for an interim groundwater treatment system was developed under contract by Bechtel Engineering under contract to Norris Industries.

The design was completed in December 1989, at which time a public meeting was held to discuss the interim action. Construction of the system was completed in December 1990; however, initial startup was delayed until May 1991 because of damage to the system caused by severe freezing conditions. The system was placed into 24-hour operation in September 1991 and has been treating groundwater for both cyanide and chromium at a rate of approximately 80 gallons per minute.

Evaporation /Percolation Ponds Removal Action: Extensive characterization of the E/P ponds was also completed during the RI phase and based on the RI findings; a removal action was completed in 1993 to address zinc-contaminated soil. The 1994 site wide ROD which addressed groundwater contamination and the landfill also documented the

E/P Pond removal action in detail and concluded that no further action was necessary at the ponds**.**

Eleven sites were identified and addressed under the IRP Program as follows:

SITE	CURRENT PHASE
RBAAP-001: Landfill	LTM (Long Term Management)
RBAAP-002: Waste Salt Disposal Pit	RC (response complete)
RBAAP-003: Groundwater Contamination Resulting from historical practices at the IWTP. Currently titled (Groundwater Treatment Plant)	RA(O) Remedial Action Operations
RBAAP-004: IWTP Effluent Sewer Line Break	RC
RBAAP-005: Bldg 13 Chromium Pretreatment	RC
RBAAP-006: H2SO4 Spill	RC
RBAAP-007: Phosphoric Acid Spill	RC
RBAAP-008: SE Storm Reservoir	RC
RBAAP-009: NW Storm Reservoir	RC
RBAAP-010: Sewage Treatment Plant/Sludge Beds	RC
RBAAP-011: E/P Ponds	RC

1994 Record of Decision: The RI/FS work which addressed the investigation of the sites was completed in 1993. In March 1994, the USEPA, DTSC, RWQCB, and the Army signed the ROD for the RBAAP following lengthy negotiations over incorporation of the Dispute Resolution Agreement. The site wide ROD contained two response actions that address the media of concern at RBAAP and documents that NFA (no further action) is required at the remaining sites. The two response actions were a groundwater response action (IRP Site RBAAP-003) and a landfill response action (IRP Site RBAAP-001). In addition, the ROD mentioned additional activities that may need to be addressed in the future including:

- investigation and potential remediation of aquifer A zone if recharge occurs and,
- further investigation of the IWTP in accordance with RCRA closure requirements.

The groundwater response action requires containment of the chromium plumes contamination in excess of 50ug/L and cyanide contamination in excess of 200ug/L and LTM. The landfill response action required installation of an appropriate final cover for the landfill and LTM.

In September 1997, the USEPA, DTSC, RWQCB, and the Army signed the Preliminary Closeout Report for construction of the RAs required in the 1994 ROD. The agencies and Army concurred that the site wide response actions had achieved "construction complete" status and that the remedy was entering the operations and maintenance (O&M) phase.

1st Five Year Review: The Army prepared the first Five-Year Review Report in 2001 to determine whether the remedial actions remain protective of human health and the environment and to assess whether the actions are functioning as designed and are operated and maintained in an appropriate manner. The report concluded that the remedy remained protective of human health and the environment and would remain so through completion (US Army, 2001). A few minor deficiencies that do not immediately impact the protectiveness of the remedy were noted in the report. USEPA concurred with the Five-Year Review Report in September 2001.

The extraction system which has operated since 1997 currently includes eight groundwater extraction wells with two of the extraction wells located on site and the others located off site, primarily west of the facility. The treatment consists of ion exchange only. RBAAP currently has a monitoring well network of 129 wells screened in the various aquifer zones (A', A, B, C and D). Four groundwater monitoring events occur throughout the year-two quarterly, one semi-annual and one annual which include specific sets of wells completed in the various A', A, B , C and D portions of the aquifer. Samples are analyzed for dissolved chromium and/or cyanide and groundwater elevation data is collected and reported.

A Firm Fixed Priced Remediation (FFPR) approach under a Performance-Based Contract (PBC) was awarded on 29 April 2004 with a period of performance of 4 years. To date, the contractor has assumed the operation and maintenance of the Groundwater Treatment System, and is conducting long-term monitoring of RBAAB-01 and RBAAP-03. In addition the second Five Year Review has been conducted and is currently in Draft form pending regulatory concurrence.

In 2005, the Army initiated a series of in situ treatments utilizing injection of sodium dithionite (reducing agent used to reduce Hexa-valent chromium to trivalent chromium) into residual source zone areas identified at the bottom of the unsaturated- aquifer A-zone clay and silt. These efforts supported by treatibility studies conducted by Lawrence Livermore National Laboratory, are targeted at reduction of residual chromium in the unsaturated zone which could act as a significant source of contamination in the future in the event that the aquifer A zone recharges. This effort should be completed by the end of FY06.

In addition, the Army is planning to conduct further on-site investigations of contaminate hot spot areas in support of potential future treatment options aimed at accelerating groundwater cleanup. The Work Plan for the characterization effort has been submitted for regulatory review and the field work is anticipated to be completed in FY06.

IRP Cleanup Exit Strategy

The Army is planning to conduct further on-site investigations of contaminate hot spot areas in support of potential future treatment options aimed at accelerating groundwater cleanup. The Work Plan for the characterization effort has been submitted for regulatory review and the field work is anticipated to be completed in FY06. GWTP optimization efforts related to extraction well configuration and extraction rates will be further explored along with optimization of monitoring in line with current site conditions.

1987

- Final Report - Remedial Investigation of the Riverbank Army Ammunition Plant, Envirodyne Engineers, Inc., April-87

1989

- Riverbank Army Ammunition Plant - Remedial Investigation/Feasibility Study Groundwater Model Calibration Report, Roy F. Weston, Inc., March-89
- Air Force Plant 44 Pilot Ground-Water Treatment Plant - Equipment Assessment Report, Bechtel Environmental, Inc., September-89
- Riverbank AAP - Investigation and Evaluation of Underground Storage Tanks , U.S. Army Engineer District - Omaha, September-89
- Engineering Evaluation/Cost Assessment Report for the Interim Ground-Water Treatment System Removal Action Selection at the Riverbank Army Ammunition Plant, Bechtel Environmental, Inc., November-89
- Ground-Water Extraction and Treatment System 100 Percent IRM Design - Riverbank Army Ammunition Plant, Bechtel Environmental, Inc., December-89

1990

- Installation Assessment of Riverbank Army Ammunition Plant, Report No. 144, U.S. Army Toxic and Hazardous Materials Agency, January-90
- Installation Assessment of Riverbank Army Ammunition Plant, U.S. Army Toxic and Hazardous Materials Agency, January-90
- Interim Remedial Measure Plan at the Riverbank Army Ammunition Plant, Bechtel Environmental, Inc., April-90

1991

- Water Quality Consultation No. 31-66-GE71-92 - Riverbank Army Ammunition Plant, U.S. Army Environmental Hygiene Agency, March-91
- Wastewater Management Survey No. 32-66-0144-91 - Riverbank Army Ammunition Plant, U.S. Army Environmental Hygiene Agency, June-91

1992

- Remedial Investigation (RI) Report - Riverbank Army Ammunition Plant, Roy F. Weston, Inc., February-92

1993

- Riverbank Army Ammunition Plant (RBAAP) Engineering Evaluation/Cost Analysis (EE/CA) for the Evaporation/Percolation (E/P) Ponds, Roy F. Weston, Inc., February-93
- Feasibility Study (FS) Report, Roy F. Weston, Inc., June-93
- Riverbank Army Ammunition Plant (RBAAP) Proposed Plan, USAEC, August-93

Previous Studies

1994

- Record of Decision, Riverbank Army Ammunition Plant, USAEC, March-94
- Evaporation/Percolation (E/P) Ponds Characterization Report, Roy F. Weston, Inc., May-94
- Riverbank Army Ammunition Plant Conceptual Design Report, Roy F. Weston, Inc., June-94
- Riverbank Army Ammunition Plant Remedial Design of Landfill Closure Work Plan, CH2MHill, June-94
- Riverbank Army Ammunition Plant Remedial Design of Groundwater Extraction and Treatment System Work Plan, CH2MHill, June-94
- Riverbank Army Ammunition Plant Landfill Closure 100 Percent Design Document, CH2MHill, December-94

1995

- Riverbank Army Ammunition Plant Groundwater Extraction and Treatment System 100 Percent Design Document, CH2MHill, August-95
- CH2M Hill. 1997. "Final Extraction System Design and Monitoring Plan with System Operating Procedures." Riverbank Army Ammunition Plant, Riverbank, California. September 24.
- CH2M Hill. 1997b. "Supplement to Design Documentation for the Groundwater Extraction and Monitoring Network, IGWTS, GWTS, and IWTP." September 23.
- CH2M Hill. 1997c. "O&M Manual, Riverbank Army Ammunition Plant, Groundwater Treatment System (GWTS)." September.
- CH2M Hill. 2005 b. "Quarterly Groundwater monitoring Report, RBAAP Groundwater Monitoring Program, 2004 – Fourth Quarter." Riverbank Army Ammunition Plant, Riverbank, California. January 31.
- CH2M Hill. 2005 c. "Quarterly Groundwater monitoring Report, RBAAP Groundwater Monitoring Program, 2005 – First Quarter." Riverbank Army Ammunition Plant, Riverbank, California. January 31.
- U.S. Army. 2005. "Second Five-Year Review Report for Riverbank Army Ammunition Plant, City of Riverbank, Stanislaus County, California." Pending.
- U.S. Army. 2001. "First Five-Year Review Report for Riverbank Army Ammunition Plant, City of Riverbank, Stanislaus County, California." February 20
- U.S. Army Material Command (AMC), 2003, Closed Transferring and Transferred Range/Site Inventory Report, Riverbank AAP, March
- U.S. Army Corps of Engineers, 2006, Final Historical Records Review, Riverbank Army Ammunition Plant, January

RIVERBANK ARMY AMMUNITION PLANT

Installation Restoration Program Site Descriptions

PBC AT RIVERBANK
PBC AT RIVERBANK

SITE DESCRIPTION

This site was established in AEDB-R to track funding for the Performance-Based Contract which was awarded in FY04. The PBC includes sites RBAAP-01 and RBAAP-03. Activities related to Site RBAAP-01 include cap maintenance and monitoring.

CLEANUP STRATEGY

Activities related to Site RBAAP-01 include cap maintenance and monitoring.

STATUS

Regulatory Driver: CERCLA

RRSE: High

Contaminants of Concern: Cyanide, Hexavalent Chromium

Media of Concern: Soil, Groundwater

PHASES	Start	End
PA	199809	199809
RA(C)	199809	199809
RA(O)	199809	200809

RIP: 199809
RC: 200809

RBAAP-01
LANDFILL, RBAAP (PAGE 1 OF 2)

SITE DESCRIPTION

RBAAP-01 is located in the northern section of the main plant near the eastern boundary. The site is approximately 4.5 acres in size and was the site of surface and trench disposal and burning from 1942 to 1966. All surface debris was removed in 1987.

Wells placed down-gradient of the landfill have indicated that the landfill was a possible source of cyanide and chromium contamination in groundwater. Cyanide contamination has been potentially linked to pot liner from aluminum reduction processes, a RCRA listed waste, and has been found in the southern portion of the landfill. Most of the pot liner was removed during previous rubble removal efforts. Chromium contamination has been potentially traced to construction rubble which contained chromium contaminated bricks. These were also removed from the site during a 1987 rubble cleanup effort.

As a compromise during dispute resolution over the draft final FS report, the Army agreed to install and maintain a clay cap at the landfill. The final site-wide 1994 ROD documents this remedial action selection.

STATUS

Regulatory Driver: CERCLA

RRSE: High

Contaminants of Concern: Cyanide, Hexavalent Chromium

Media of Concern: Soil, Groundwater

PHASES	Start	End
PA	197910	198009
SI	198010	198509
RI/FS	198510	199306
RD	198709	199502
IRA	198910	199009
RA(C)	199506	199509
RA(O)	199509	200109
LTM	200203	201509

RIP: 199509
RC: 200109

Implementation of the landfill remedial action began in June 1995 and initial work was completed in October 1995. Additional seeding was performed in 1996. The final landfill cover included, from top to bottom, a 2-foot-thick vegetative cover layer, a 0.25-inch-thick geo-synthetic liner, and a 2-foot-thick foundation layer. The landfill cap was designed and constructed to drain rainfall off of and away from the landfill. After installation of the cap and associated drainage and final grading, the cover was hydro-seeded with native gas.

As part of the first five year review some damage was caused in 1997 by construction activity on the adjoining railroad tracks. This was noted in the first five year review and repairs were made. The second five year review is in development and is expected to be completed in FY06.

Annual surveys to assure stability and annual management of a pesticide program to prevent damage to the completed Landfill Cap are being conducted.

RBAAP-01
LANDFILL, RBAAP (PAGE 2 OF 2)

A Performance Based Contract (PBC) was awarded in FY04 and includes sites RBAAP-01 and RBAAP-03. The PBC activities related to Site RBAAP-01 include cap maintenance and monitoring.

CLEANUP STRATEGY

Long Term Management will continue to include maintenance of the Landfill Cap and quarterly groundwater monitoring.

RBAAP-03
GROUNDWATER CONTAMINATION

SITE DESCRIPTION

RBAAP-03 is located in the central part of the main plant area and represents chromium groundwater contamination resulting from leakage associated with the original Industrial Waste Water Treatment Plant (IWTP). The original IWTP at RBAAP was constructed to treat the wastewaters generated from the electroplating, cleaning and metal finishing processes that are operated on-site. The original storage and equalization tanks used for the IWTP were made of redwood. During periods of low flow to the IWTP the redwood would desiccate, causing gaps between the timbers. Upon filling, fluid would leak through the gaps to the ground until the timbers swelled once again and closed the gaps. From 1973 to 1980 the IWTP was upgraded and the redwood tanks were replaced with concrete tanks and the upgraded IWTP continues to operate under a RCRA Part B Permit. Based on groundwater contamination in the area, the original IWTP redwood tank area was identified as the major source of chromium contamination to groundwater.

STATUS

Regulatory Driver: CERCLA

RRSE: High

Contaminants of Concern: Hexavalent Chromium

Media of Concern: Soil, Groundwater

PHASES	Start	End
PA	197910	198009
SI	198010	198509
RI/FS	198510	199306
RD	198709	199504
IRA	198910	199012
RA(C)	199609	199809
RA(O)	199609	200810
LTM	200810	202309

RIP: 199809
RC: 200810

In March 1994, the USEPA, DTSC, RWQCB, and the Army signed a ROD for the RBAAP. The final site-wide ROD required expansion of the groundwater treatment system to fully capture groundwater contamination. This system is now removing the contaminated groundwater by means of Ion Exchange. In addition, the ROD mentioned additional activities that may need to be addressed in the future including investigation and potential remediation of the aquifer A zone if recharge occurs and further investigation of the IWTP in accordance with RCRA closure requirements (upon closure of the RCRA Part B Permit). The groundwater response action requires containment of the chromium plume showing contamination in excess of 50ug/L and cyanide contamination in excess of 200ug/L and groundwater monitoring. Currently groundwater monitoring consists of four sampling events per year; two quarterly, one semi-annual and one annual which include specific sets of wells completed in the various A', A, B, C and D portions of the aquifer.

In September 1997, the USEPA, DTSC, RWQCB, and the Army signed the Preliminary Closeout Report for construction of the RAs required in the 1994 ROD. The agencies and Army concurred that the site wide response actions had achieved "construction

complete" status and that the remedy was entering the operations and maintenance (O&M) phase.

The Army prepared the first Five-Year Review Report in 2001 to determine whether the remedial actions remain protective of human health and the environment and to assess whether the actions are functioning as designed and are operated and maintained in an appropriate manner. The report concluded that the remedy remained protective of human health and the environment and would remain so through completion. The second five year review is in development and is expected to be completed in FY06.

In 2005 the Army initiated a series of in situ treatments utilizing injection of sodium dithionite (reducing agent used to reduce hexavalent chromium to trivalent chromium) into residual source zone areas identified at the bottom of the unsaturated - aquifer A-zone clay and silt. These efforts supported by treatibility studies conducted by Lawrence Livermore National Laboratory, are targeted at reduction of residual chromium in the unsaturated A zone which could act as a significant source of contamination in the future in the event that the aquifer A zone recharges. This effort should be completed by the end of FY06. Based on the 2005 fourth quarter sampling results, chromium was detected in 9 wells out of the 45 wells sampled. Levels of chromium ranged from 6.48 ppb to 336 ppb. Concentrations of chromium detected in off-post wells exceeded the cleanup standard of 50 ppb in three wells (PW115B and C A and MW111A). Cyanide was not detected above the cleanup standard of 200 ppb and ranged from 5.8 to 138 ppb.

A Performance Based Contract (PBC) was awarded in FY04 and includes sites RBAAP-01 and RBAAP-03.

CLEANUP STRATEGY

Long Term Management and Operations of the Groundwater Treatment System will continue and management of the electronically produced analytical results will continue. The Army is planning to conduct further on-site investigations of contaminant hot spot areas in support of potential future treatment options aimed at accelerating groundwater cleanup. The Work Plan for the characterization effort has been submitted for regulatory review and the field work is anticipated to be completed in FY06. The Army will continue to evaluate optimization actions for both the GWTP and monitoring program.

IRP No Further Action Sites Summary

AEDB-R #	Site Title	Documentation/Reason for NFA	NFA Date
RBAAP-02	WASTE SALT DISPOSAL PIT	ROD/ Study complete no clean-up required	199306
RBAAP-04	IWPT EFFLUENT SEWER LINE BREAK	ROD/ Study complete no clean-up required	199306
RBAAP-05	BLDG 13, CHROMIUM TRMT	ROD/ Study complete no clean-up required	199306
RBAAP-06	IWPT H2SO4 SPILL	ROD/ Study complete no clean-up required	199306
RBAAP-07	BLDG 13 PHOS SPILL	ROD/ Study complete no clean-up required	199306
RBAAP-08	SE STORM RESERVIOR	ROD/ Study complete no clean-up required	199306
RBAAP-09	NW STORM RESERVIOR	ROD/ Study complete no clean-up required	199306
RBAAP-10	SEWAGE TRMT PLNT/SLUDGE BEDS	ROD/ Study complete no clean-up required	199306
RBAAP-11	PERC/EVAP PONDS (STANTISLAUS)	ROD/All Required Cleanup Completed	199312

IRP Schedule

Initiation of IRP: 1980

Past Phase Completion Milestones:

1980
IRP PA Initiation, Jan

1985
PA/SI, Installation, Sep

1989
Interim GWTS Design (RBAAP-01 and 03), Dec

1991
Interim GWTS On-line (RBAAP-01 and 03), May

1992
RI (All sites), Feb
Waterline Design (RBAAP-01 and 03), Mar
Waterline On-line (RBAAP-01 and 03), Dec

1993
FS (All sites), Jun
EE/CA (RBAAP-11), Jun
Action Memorandum (RBAAP-11), Aug
Removal Action (RBAAP-11), Oct
Proposed Plan (Site-wide), Sep

1994
ROD (Site-wide), Mar
Remedial Design (Landfill), Dec

1995
Remedial Design (GWTS), Aug
Remedial Action (Landfill), Oct

1996
NPL Delisting Petition, Sep
Remedial Action (GWTS), Sep

1997
Construction Completion (Site-wide), Sep

2001
First Five Year Review Report

IRP Schedule

Projected Record of Decision (ROD)/Decision Document (DD) Approval Dates:
Unknown

Projected Construction Completion Date of IRP: 1998

Projected Date for Removal from NPL: TBD

Schedule for Next Five-Year Review: 2006

Estimated Completion Date of IRP (including LTM phase): 2023

Riverbank Army Ammunition Plant IRP Schedule

(Based on current funding constraints)

AEDB-R #	SITE NAME	PHASE	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15+
PBC	PBC at Riverbank	RA(O)									
RBAAP-01	Landfill, RBAAP	LTM									201509
RBAAP-03	Groundwater Contamination (GWC)	RA(O)									
		LTM									202309

Prior Years Funds

Total Funding up to FY04: $53,664K

Year	Site Information	Expenditures	FY Total
FY05	RBAAP-03 RA(O)	$716K	
	RBAAP-PBC RA(O)	$247K	**$963K**

Total Prior Year Funds: $54,627K

Current Year Requirements

Year	Site Information	Requirements	FY Total
FY06	RBAAP-03 RA(O)	$741K	**$741K**

Total Funding for FY06: $741K

Total Future Requirements: **$2,781K**

Total IR Program Cost *(from inception to completion of the IRP):* **$58,149K**

RIVERBANK ARMY AMMUNITION PLANT

Military Munitions Response Program

MMRP Summary

Total AEDB-R MMRP Sites/AEDB-R sites with Response Complete: 1/0

AEDB-R SITE TYPES:
1 Pistol Range

Most Widespread Contaminants of Concern: MC

Media of Concern: Soil

Completed REM/IRA/RA:

Total MMRP Funding

Prior Years (up to FY05):	$ 34K
Current Year Funding (FY06):	$ 4K
Future Requirements (FY07+):	$ 0K

Duration of MMRP
Year of MMRP Inception: 2002
Year of MMRP RC: 2007
Year of MMRP Completion including Long-Term Management (LTM): 2007

MMRP Contamination Assessment

MMRP Contamination Assessment Overview

The Army has completed a “Closed, Transferring and Transferred Range/Site inventory Report”, March 2003. Pursuant to the “CTT Range and Site Summaries” on page D-2 of the aforementioned document, the backstop for the pistol range was incorporated into the levee of a reservoir. Additionally, the reservoir levees were removed and reconstructed in 1980 because of their poor condition. The conclusions of the CTT/Site Inventory Report were that the pistol range had not been in operation from 1967 to the present and the Risk Assessment Code (RAC) for the pistol range was 5: Negligible Explosives Safety Risk – No explosive related action necessary.

Following the information collected as part of the 2003 Phase III Closed Transferring and Transferred Range Inventory it was determined that additional records search was needed to further understand the operational nature of this range. The further records review was initiated in November 2005 and was completed with the Final Historical Records Review Document in January 2006. Based on the findings of the HRR it was determined that the range was probably in operation only during the 1950s and that the berm had been altered in the 1960s and torn down and reconstructed in the 1980s.There have been no known response actions at this range.

MMRP Cleanup Exit Strategy

Due to the reworking of the soil as part of the levee reconstruction it is unlikely that unexpended rounds would be found and the presence of Munitions Constituents (MC) may also be unlikely. Based on the Phase III CTC Range Inventory and HRR findings, no further investigation or remedial action is anticipated. The HRR will be provided along with additional close out documentation required by the regulatory agencies.

RIVERBANK ARMY AMMUNITION PLANT

Military Munitions Response Program Site Descriptions

RBAAP-001-R-01
PISTOL RANGE

SITE DESCRIPTION

This site represents the former location (berm removed in 1980s) of a closed pistol range, still owned by the U.S. Army, comprising .29 acres in the northwestern portion of the main installation property, and oriented towards the northeast. Following the information collected as part of the 2003 Phase III Closed Transferring and Transferred Range Inventory it was determined that further records search was needed to further understand the operational nature of this range. The further records review was initiated in November 2005 and was completed with the Final Historical Records Review Document in January 2006. The HRR provided the following description of the range

STATUS

Regulatory Driver: CERCLA

RAC Score: 5 Negligible Risk

Contaminants of Concern:
Munitions Constituents (MC)

Media of Concern: Soil

PHASES	Start	End
PA	200210	200305
SI	200507	200709

RC: 200709

Only small arms munitions were expended on this range. The range is part of an area that is currently undeveloped and is used for cattle grazing. Although documentation was not located indicating definite dates of construction or use, based on the available figures and interviews, it appears that it was used in the 1950s. This range is depicted on an historical map from 1956; however, more recent maps show no indication of the range. The range is located north of the main plant, adjacent to Claus Road. There is a locked gate along the western edge of the site that is accessible from Claus Road. The area, with the exception of the reservoir, consists of open grassland. During the site visit, there was no sign of the range or any munitions. There appeared to be a concrete foundation from one of the former buildings, but none of the structures remain. One interviewee indicated that he recalled visiting the site as a boy with his father and watching the security forces practicing at the range. He stated that the range was only used in the 1950s. He stated that it was used rarely and estimated that no more than 100 rounds would have been used over the years. Another interviewee who works at the plant stated that the range was not used during his tenure, which began in 1967. The berm surrounding the reservoir was changed in the 1960s; however, there is no record of the project or what happened with the dirt. It was mentioned that the levees surrounding the reservoir, which included the backstop for this range, were also torn down in 1980, due to their poor condition, and reconstructed.

Because small arms were the only munitions used at the Pistol Range, potential Munitions and Explosives of Concern (MEC) at the site may include complete rounds at the firing line. However, based on the reconstruction of the reservoir, no MEC or munitions debris is expected. Potential munitions constituents (MC) at this site includes metals and/or

explosives residue related to small arms although the presence of these compounds is unlikely since the soil associated with the berm has been extensively reworked as part of the levee reconstruction.

CLEANUP STRATEGY

Due to the reconstruction of the former berm and the short duration of use for pistol target practice it is unlikely that MC/MEC remain. The HRR will be provided along with additional close out documentation required by the regulatory agencies. No further investigation or remedial action anticipated.

MMRP Schedule

Initiation of MMRP: 2002

Past Phase Completion Milestones

2003
PA, RBAAP-001-R-01, May

Projected ROD/DD Approval Dates: Unknown

Schedule for Five Year Reviews: NA for MMRP

Estimated Completion Date of MMRP including LTM: 200709

Prior Years Funds
Funding up to FY04: $0K

Year	Site Information	Expenditures	FY Total
FY05	SI, RBAAP-001-R-01	$ 34K	**$34K**

Total Prior Year Funds: $34

Current Year Requirements

Year	Site Information	Requirements	FY Total
FY06	SI, RBAAP-001-R-01	$4K	**$4K**

Total Funding FY06: $4K

Total Future Requirements: **$0**

Total MMR Program Cost *(from inception to completion of the IRP):* **$38K**

Community Involvement

A strong relationship between RBAAP and the community began in 1985 with the formulation of the TRC, the precursor to today's RABs. In 1943, DoD established RABs to increase public participation. RBAAP solicited community interest in forming a RAB, but since the cleanup process was already well underway, the ROD was already signed, and the community had been well informed throughout the process, little interest was expressed in establishing a RAB. Since the community was not in favor of establishing a formal RAB, RBAAP requested exemption to the DoD RAB policy to keep the TRC intact. Based on the current status of RBAAP as a BRAC05 Installation, the Army will solicit interest from the public concerning the formation of a RAB and establish a RAB if interest exists.